MSMR

Medical Surveillance Monthly Report

Vol. 8 No. 8 **November/December 2002**

USACHPPM

Contents

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Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
DEC 2002		**00-11-2002 to 00-12-2002**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Medical Surveillance Monthly Report (MSMR). Volume 8, Number 8, November/December 2002	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **U.S. Army Center for Health Promotion and Preventive Medicine,Armed Forces Health Surveillance Center (AFHSC),2900 Linden Lane, Suite 200,Silver Spring,MD,20910**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**20**	

Alcohol Disorders among Active Duty Members, U.S. Armed Forces, January 1998-March 2002

Alcohol disorders are among the leading sources of disease burden in industrialized countries,[1] and the finding is not exclusive to civilian populations. For example, a recent study among US Navy recruits found that, despite being overwhelmingly underage, 75% had consumed alcohol and 26% had engaged in heavy drinking in the year prior to enlisting.[2] Surveys among active military members found that they are significantly more likely than their civilian counterparts to engage in heavy uses of alcohol and that heavy drinking is especially prevalent among the youngest and male members.[3] In the 1990s, alcohol dependence was the second leading cause of hospitalizations of servicemembers; and in 2001, alcohol dependence was the sixth leading cause of ambulatory visits (source: DMED). Finally, drinking alcohol has been associated with increased risk of accidental death among US soldiers.[4] Appropriately, the US Department of Defense has included alcohol disorders among its top priorities for prevention.[5] For this report, records of hospitalizations and ambulatory medical visits were used to estimate rates of, and to characterize individuals who received, diagnoses of alcohol disorders (including "abuse" and "dependence") while serving on active duty in the US military between January 1998 and March 2002.

Methods: The Defense Medical Surveillance System (DMSS) was searched to identify all diagnoses of alcohol disorders among active duty members of the US Armed Forces from 1 January 1998 through 31 March 2002. For analysis purposes, individuals were classified as alcohol disorder cases if ICD-9-CM codes 303 "alcohol dependence syndrome" (which includes "acute alcoholic intoxication," "acute drunkenness in alcoholism," "other and unspecified alcohol dependence," and "chronic alcoholism") and/or 305.0 "alcohol abuse" (which includes "drunkenness-not otherwise specified," "excessive drinking of alcohol-not otherwise specified," "hangover (alcohol)," and "inebriety-not otherwise specified") were assigned as a diagnosis in any position during a medical encounter. Up to 8 diagnostic codes were reported on hospitalization records and up to 4 on ambulatory records. If individuals had encounters in both clinical settings on the same day, information from the hospitalization record was used for the analysis. For individuals with more than one medical encounter with an alcohol-related diagnosis during the surveillance period, information from the first encounter was used for the analysis (and the total number of alcohol-related encounters was noted).

Rates of alcohol disorder were calculated by dividing the number of cases of alcohol disorder within each demographic subgroup by the total number of servicemembers at risk in the same group during the surveillance period. In addition, to describe how alcohol disorders may impact attrition from military service, Kaplan-Meier survival analyses were conducted to estimate the cumulative probabilities of remaining in military service after first diagnoses of alcohol and other selected disorders.

Results: During the surveillance period, 89,341 active duty members of the US Armed Forces were diagnosed with alcohol disorders—of these, nearly two-thirds (64%) had subsequent alcohol related encounters in a military medical facility during the period (range:1-360 visits, data not shown).

Compared to members of the US Armed Forces in general, servicemembers with alcohol disorder-related diagnoses were more likely to be younger than 21, unmarried, enlisted, and in a junior grade (figure 1). Of particular note, enlisted servicemembers in grades E-1 through E-4 accounted for nearly 80% of alcohol disorder-related diagnoses but fewer than 45% of the total active force (figure 1). Of interest, servicemembers with alcohol disorder-related diagnoses generally reflected the race/ethnicity distribution of the overall force (figure 1).

In general, rates of alcohol disorder-related diagnoses were highest among the youngest aged servicemembers, declined with increasing age, and were higher among men than women (table 1, figures 2a-d). A notable exception was among male Marines in whom the rate was highest among 21-24 year olds and then sharply declined with increasing age (figure 2d).

Finally, the survival curves in figure 3 describe how alcohol disorders (in relation to other disorders)

Figure 1. Percentage distributions of characteristics among servicemembers who received alcohol disorder-related diagnoses (relative to all active duty members of the US Armed Forces, January 1998-March 2002).

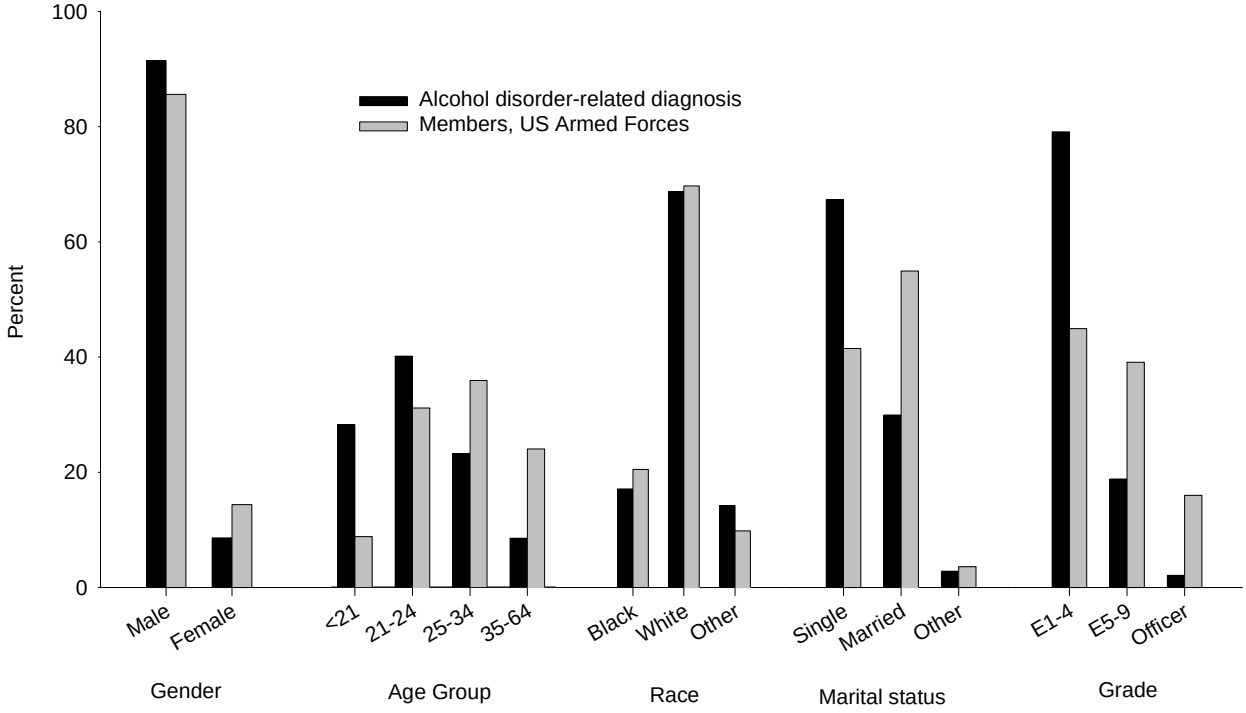

Table 1. Rates of alcohol disorder-related diagnoses during hospitalizations and ambulatory visits of active duty members, US Armed Forces, January 1998-March 2002.

	No.	Rate*	Relative rate
Overall	89,341	15.5	
Gender			
Male	81,695	16.4	1.8
Female	7,646	9.2	ref
Age group			
< 21	25,167	27.4	5.1
21-24	35,835	25.4	4.7
25-34	20,775	10.0	1.9
35-64	7,564	5.4	ref
Service			
Army	40,369	21.3	2.8
Navy	24,784	16.8	2.2
Marines	13,461	19.7	2.6
Air Force	10,727	7.6	ref

*Rate per 1,000 persons-years

may affect attrition from service. For comparison purposes, the figure shows probabilities of remaining in service in relation to time after diagnoses of alcohol disorders, alcohol disorders plus comorbid mental disorders, diabetes mellitus, and acute appendicitis. Within 6 months after first diagnosis during the surveillance period, approximately 80% of individuals with alcohol disorders and 60% of those with alcohol disorders plus comorbid mental disorder were still on active duty; thus, approximately 20% and 40%, respectively, had left military service within 6 months of first diagnoses. Also within one year of first diagnoses during the surveillance period, approximately one-third of servicemembers with alcohol disorders and approximately 60% of those with alcohol disorders plus comorbid mental disorders had left military service. By comparison, 25% of servicemembers with diabetes mellitus (another chronic condition) and 15% of those with appendicitis (an acute condition generally compatible with continued service after convalescence) had left military service within one year of diagnoses (figure 3).

Editorial comment: This report documents that the highest rates of alcohol disorder-related diagnoses are among the youngest, enlisted, unmarried, and male servicemembers and in the Army and Marines. This report also suggests that an alcohol disorder-related diagnosis is strongly associated with discharge from service within a few months after first diagnosis in a military medical facility, especially in cases where a comorbid mental disorder diagnosis is present. The association between alcohol disorders and premature discharge from service, coupled with other well-documented risks associated with youthful drinking, make alcohol abuse among young servicemembers a significant threat to the health, fitness, and operational readiness of the US Armed Forces. These findings extend and update insights gained from numerous previous studies and surveys of alcohol use among US servicemembers.

The results of this surveillance summarize the overall scope and some military operational consequences of alcohol related morbidity. They also focus attention on the problem of underage drinking in the military. Although fewer than 9% of all US servicemembers are under the age of 21, more than 28% of those receiving a diagnosis of alcohol disorder are under 21 (the legal drinking age in the US). Interventions that are targeted at servicemembers younger than 21 years of age are indicated to decrease the widespread medical, social, occupational, and military consequences of alcohol-related disorders.

Interpretations of these results should consider several potential shortcomings. For example, ascertainment of alcohol disorders based on diagnoses in military medical treatment facilities is probably incomplete; in addition, ascertainment of alcohol disorders is likely to be more complete among servicemembers who live in barracks on military installations (e.g., junior enlisted servicemembers who are unmarried) relative to their counterparts.

More detailed studies are necessary to further characterize subgroups at particularly high risk of alcohol disorders and to understand the full extent of alcohol abuse problems in the US Armed Forces. For example, future investigations should examine differences in risks of alcohol disorders in relation to age, marital status, geographic locations, settings, and military occupations (other studies have found, for example, that soldiers in certain Army occupational groups have higher prevalences of unhealthy behaviors, including drinking, than others).[6]

Analysis and report by Marsha F. Lopez, PhD, Analysis Group, Army Medical Surveillance Activity.

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Figure 2a. Rate of incident diagnoses of alcohol disorder among active duty Army, by sex and age group, January 1998-March 2002

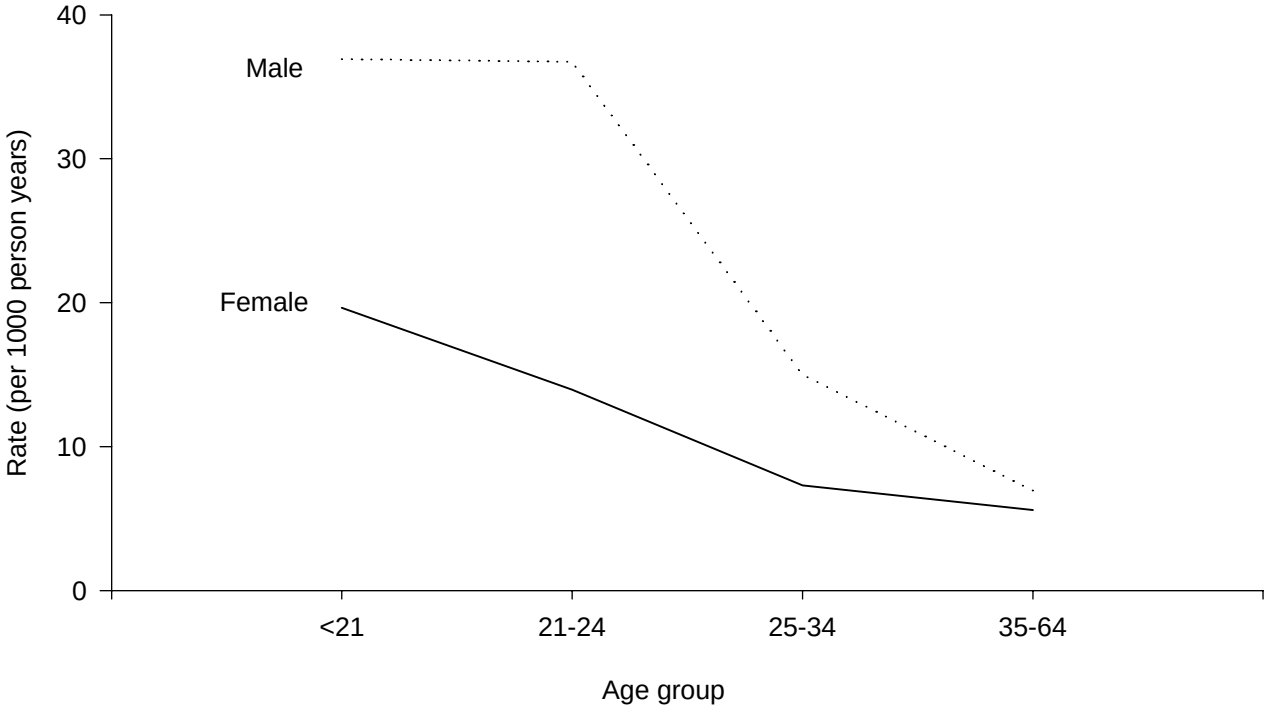


Figure 2b. Rate of incident diagnoses of alcohol disorder among active duty Navy, by sex and age group, January 1998-March 2002.

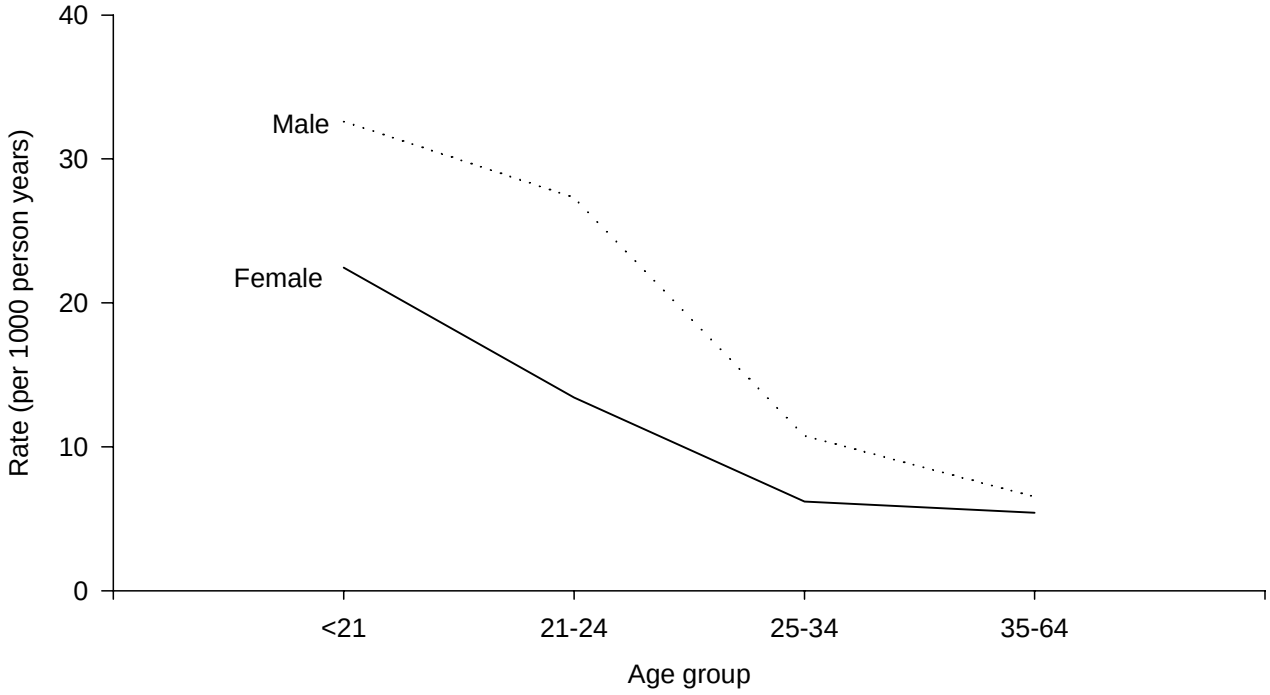


Figure 2c. Rate of incident diagnoses of alcohol disorder among active duty Air Force, by sex and age group, January 1998-March 2002.

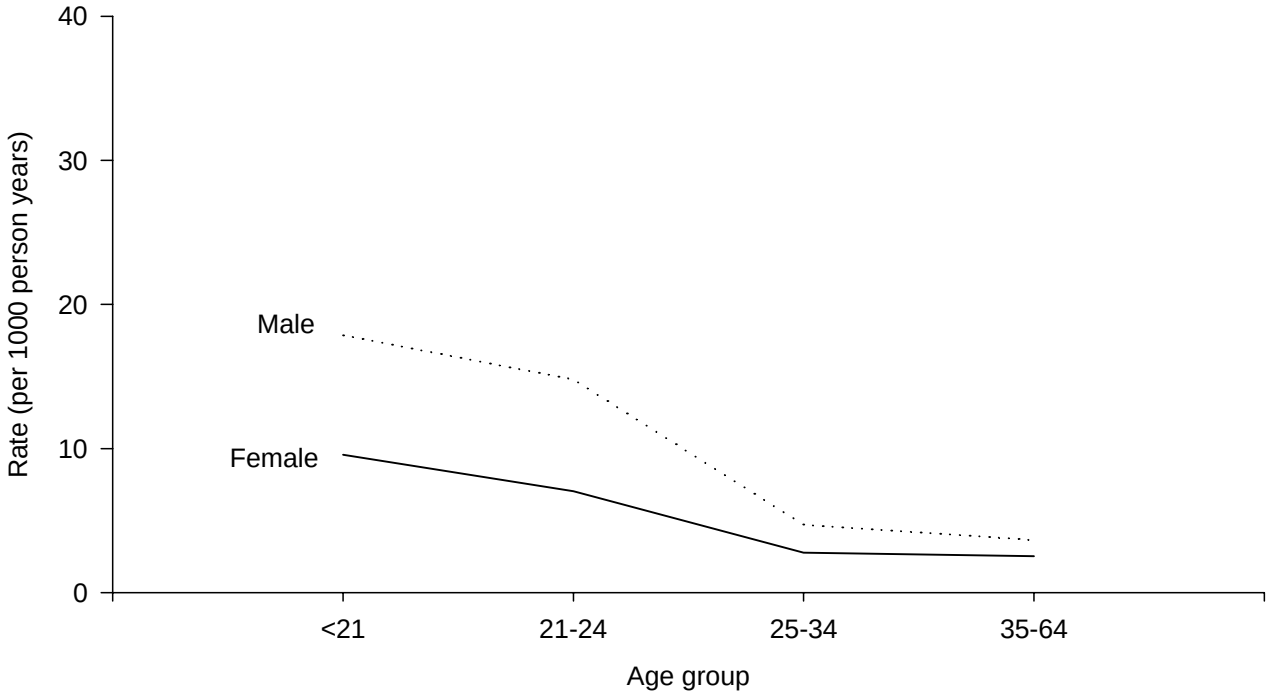


Figure 2d. Rate of incident diagnoses of alcohol disorder among active duty Marines, by sex and age group, January 1998-March 2002.

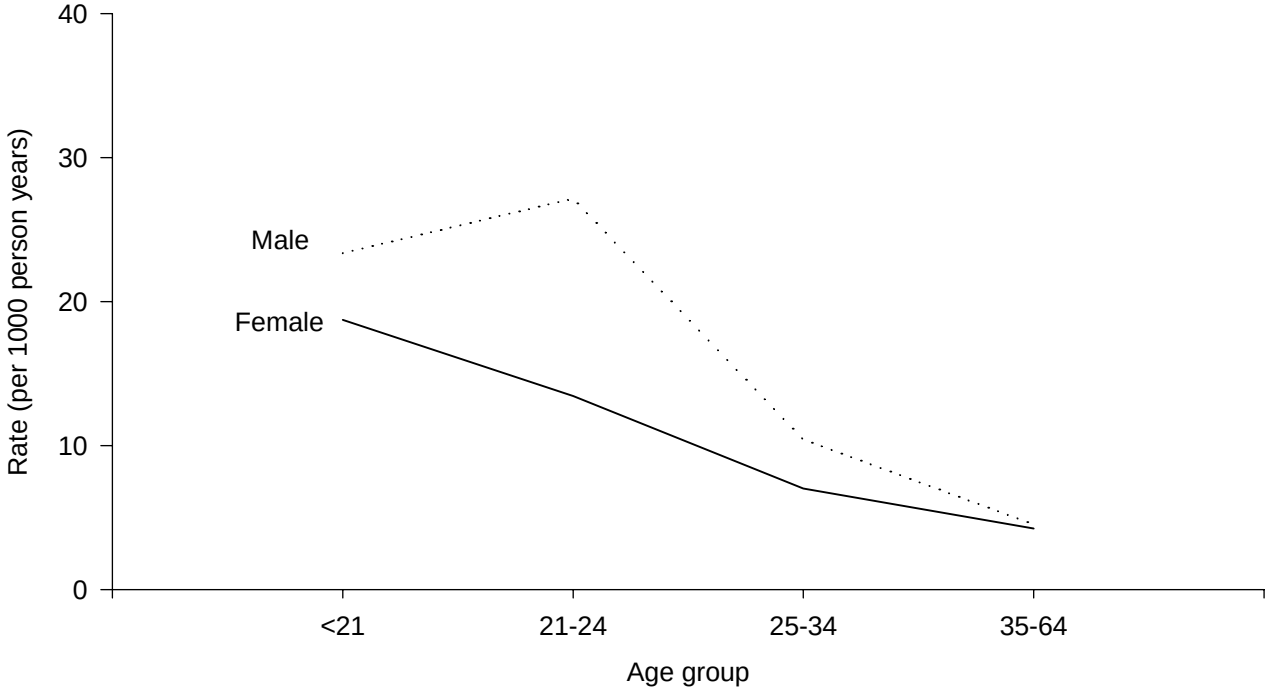
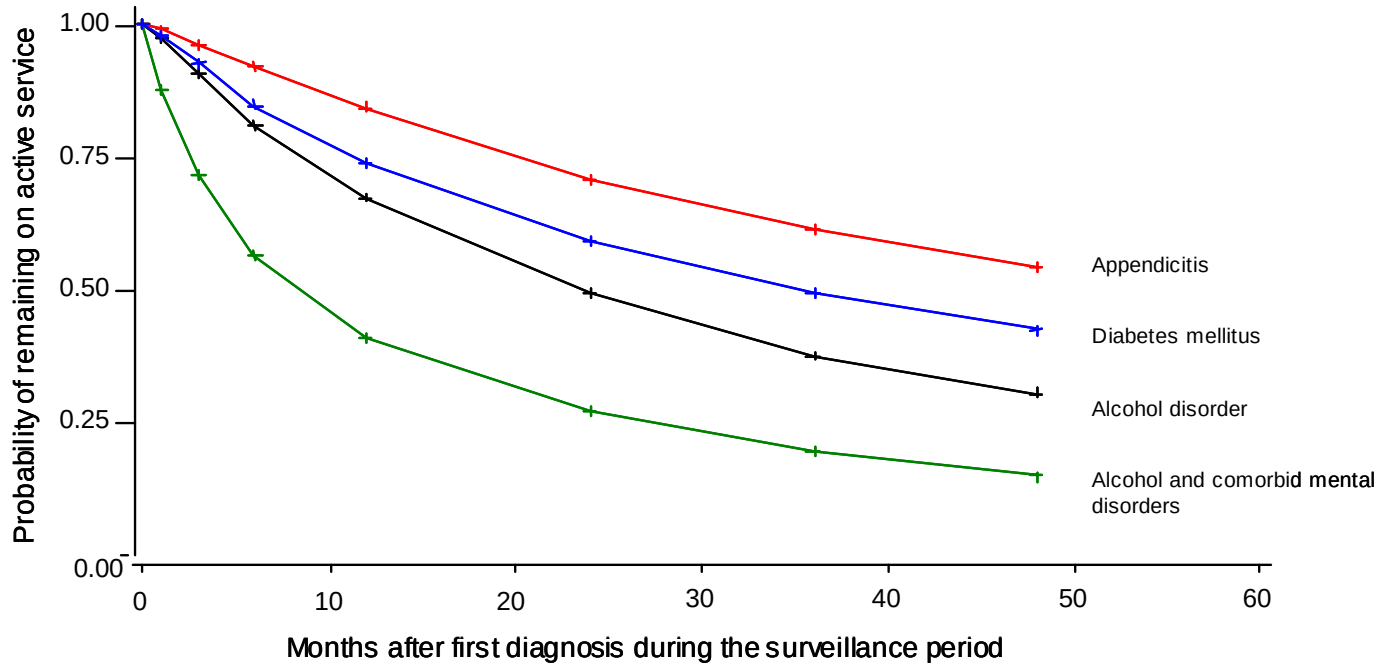


Figure 3. Probability of remaining on active military service by time after first diagnosis of selected disorders, US Armed Forces, January 1998-March 2002.



+ marks represent 1, 3, 6, 12, 24, 36, 48, 60 months since diagnosis

Frequency and Nature of Exposure Concerns Following Recent Major Deployments: Analyses of Post-Deployment Questionnaire Responses, October 1998-July 2002

Prior to and after returning from major overseas deployments, servicemembers are required to complete standardized health assessments. Completed pre- and post-deployment health assessments are forwarded to the Army Medical Surveillance Activity (AMSA) where they are integrated into the Defense Medical Surveillance System (DMSS). The post-deployment health assessment includes the following question regarding exposure concerns: "Do you have concerns about possible exposures or events during this deployment that you feel may affect your health?" The question is followed by a free text area that solicits specific information regarding exposure concerns.

In June 2002, chemical field tests at a U.S. base in Uzbekistan revealed traces of possible nerve and blister agents.[1] Further testing revealed that the initial results were "false positives." For this report, free text responses regarding post-deployment exposure concerns were compared among participants in recent major deployments in general and US servicemembers who had recently returned from Uzbekistan.

Methods: The DMSS was searched to identify all post-deployment forms that were completed during fiscal years 1999 and 2000 (1 October 1998 to 30 September 2000, after any major deployment) and between 11 September 2001 to 26 July 2002 (after deployment to Uzbekistan). Free text responses regarding exposure concerns were classified using the following categories: 1. *Biological*: blood borne pathogens, molds, parasites; 2. *Chemical*: heavy metals (e.g., lead, mercury, iron, arsenic), solvents, fuels (e.g., JP5, JP8, kerosene, petroleum products), pesticides/ insecticides, dust, fumes, asbestos, silica, formaldehyde, cigarette smoke, local industrial plant by-products, HAZMAT site, oil fires/refineries, chlorine, burning trash/tires, chemicals in general; 3. *Physical*: non-ionizing radiation (e.g., laser, RFR, microwaves, UV), ionizing radiation (e.g. uranium, depleted uranium), radiation in general, noise; 4. *Mental stress*: sleep deprivation, family issues, depression, stress in general; 5. *Immunizations*: anthrax vaccine, tetanus vaccine; 6. *Reportable medical events*: biological warfare agents, carbon monoxide, chemical agents, cold weather injuries, sexually transmitted diseases, filariasis, hantavirus disease, heat injuries, hepatitis, Lyme disease, malaria, meningococcal disease, salmonellosis, tuberculosis, tularemia; 7. *General*: sanitation, air pollution, water pollution, pollution in general, food, Gulf War Syndrome, carcinogens, diseases, mosquitoes, rodents, local civilians, ill patients/people, "mad cow" disease, hoof and mouth disease, power lines; 8. *Non-environmental medical concerns*: URI, rash, musculoskeletal problems. 9. *Miscellaneous*: unknown gas smells, riots, crash site, unknowns, carpet glue, Kosovo, Bosnia. 10. *Illegible.*

Results, deployments in general: Of 104,996 post-deployment forms completed between 1 October 1998 and 30 September 2000, 4,537 (4.3%) had "yes" responses to the exposure concern question. Respondents who reported exposure concerns tended to be male, white, of the rank E5-E9, and in the active component (table 1). Members of the Air Force were relatively underrepresented among "yes" (43%) compared to "no" (63%) responders; otherwise, there were no major differences in demographic characteristics between "yes" and "no" responders to the exposure concern question.

The highest numbers of exposure concerns were in the general (22% of the total), chemical (21%), non-environmental medical (19%), and reportable medical events (13%) categories (table 2). Within these categories, the most frequently reported specific concerns were air pollution (general); dust (chemical); and tuberculosis (reportable medical events).

The most frequently reported specific concerns (regardless of category) in descending order were: anthrax immunization; air pollution; tuberculosis; dust; depleted uranium; asbestos; pollution in general; water pollution; oil fires/refineries; sanitation; local industrial plant products, burning trash/tires, food sanitation; chemicals; mosquitoes/ insects/bugs; carbon monoxide; HAZMAT sites, radio frequency radiation; pesticides, ultraviolet radiation; blood borne pathogens; malaria, sexually transmitted

Table 1. Characteristics of respondents who answered "yes" to the post-deployment exposure concerns question, after major deployments, 1 October 1998–30 September 2000, and after deployment to Uzbekistan, 11 September 2001– 26 July 2002

Demographic characteristics	Other deployments		Uzbekistan	
	No.	%*	No.	%*
Gender				
Male	3,705	81.7	48	78.7
Female	486	10.7	8	13.1
Race/ethnicity				
White/Caucasian	3,137	69.1	42	68.9
Black/African American	599	13.2	11	18.0
Hispanic/Latino	227	5.0	1	1.6
Asian/Pacific Islander	95	2.1		
Grade				
E1-E4	1,351	29.7	9	14.7
E5-E9	2,023	44.6	14	23.0
O1-O3	410	9.0	4	6.6
O4-O6	269	5.9	5	8.2
W1-W5	109	2.4		
Service				
Army	2,037	44.9	2	3.3
Air Force	1,934	42.6	30	49.2
Marine	101	2.2		
Navy	88	1.9		
Coast Guard	2	<1		
Component				
Active	3,151	69.5	31	50.8
Reserve	545	12.0	1	1.6
National Guard	466	10.3		
Operation/deployment location				
Southwest Asia	2,147	47.3		
Kosovo	1,383	30.5		
Bosnia	506	11.2		
USA	3	<1		
Other/unknown	488	10.8		
Enduring Freedom			61	100.0

* percentages may add to <100% due to missing/unknown information.

diseases, fuels; and lead, radiation in general, stress in general, local civilians (table 3). Of 488 individuals who reported concerns regarding anthrax immunizations (the most frequently reported concern), 84% were in the Air Force.

Results, Uzbekistan. Between 11 September 2001 and 26 July 2002, 127 post-deployment questionnaires were completed by servicemembers returning from Uzbekistan. Sixty-one respondents (48% of the total) answered "yes" to the exposure concerns question. Respondents who reported exposure concerns tended to be male, white, in the active component, and in the Air Force (table 1).

The highest numbers of exposure concerns were in the physical (39% of the total), chemical (30%), and reportable medical events (18%) categories (table 2). Within these categories, the most frequently reported specific concerns were uranium (physical); asbestos (chemical); and chemical agents (reportable medical events).

The most frequently reported specific concerns (regardless of category) in descending order were: uranium; radiation in general; asbestos; chemical agents; tuberculosis; depleted uranium; fuels, dust, chemicals, sanitation; petroleum products, water pollution; rodents; and HAZMAT sites, food sanitation, mosquitoes/bugs (table 3).

Editorial comment. This analysis documents differences in exposure concerns among deployers in general and deployers to Uzbekistan. Compared to their counterparts, deployers to Uzbekistan were more concerned with exposures to uranium and radiation, while deployers in general were more concerned with anthrax immunizations and air pollution. Deployers in both groups were relatively concerned with exposures to tuberculosis, asbestos, and depleted uranium.

Limitations of this summary include the following: first, at the time of the analysis, there were relatively few post-deployment reports related to Uzbekistan; hence, the findings related to Uzbekistan are relatively unstable and could change significantly over time. Second, the ascertainment of post-deployment information was incomplete. Although pre- and post-deployment medical assessments are required, the number of servicemembers who have returned from deployments greatly exceeds the number of post-deployment surveys received by AMSA. Clearly, not all deployed servicemembers have completed post-deployment surveys, and not all completed surveys have been sent to AMSA. Third, the large numbers of non-environmental medical concerns that have been reported suggest that many servicemembers misinterpret the exposure concerns question. Fourth, exposure concerns were summarized using a subjective classification system developed for this analysis. Finally, because the concerns were expressed in free text, many were difficult to read and understand.

If post-deployment exposure concerns are to be reliably ascertained and followed up, the following must occur: first, the identities of all deployed servicemembers and the dates and locations of their deployments must be accurately recorded and reported; second, all deployed servicemembers must complete a post-deployment questionnaire; third, all completed questionnaires must be sent to a central location (AMSA) and archived (Defense Medical Surveillance System); fourth, the exposure concerns question must be worded to express its intended purpose; fifth, perhaps, categorical rather than free text responses should be offered (possibly based on categories such as those described above); sixth, there should be medical/administrative follow-ups of all positive responses; and finally, commanders may be better able to mitigate or address soldiers' exposure concerns related to deployments through pre- and post- deployment risk communication and education.

Analysis and report by CPT Ting Jennifer Tai, MD, MPH, with advice/assistance from Coleen Weese, MD, MPH, and Vivian Rush, MD, MPH, USACHPPM.

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1. Willamson J. Army investigates chemical contamination in Uzbekistan. Army News Service, Washington, DC. June 11, 2002.

Table 2. Number and percent of exposure concerns reported on post-deployment questionnaires, by category, after major deployments in general, 1 October 1998–30 September 2000, and after deployment to Uzbekistan, 11 September 2001–26 July 2002

	Other deployments		Uzbekistan	
Category	No.	%	No.	%
Physical	412	8.8	48	38.7
Chemical	969	20.6	37	29.8
Reportable medical events	626	13.3	22	17.7
General	1,053	22.4	13	10.5
Non-environmental, medical	910	19.4	3	2.4
Miscellaneous	115	2.4	1	0.8
Immunizations	489	10.4	0	0.0
Mental stress	57	1.2	0	0.0
Biological	52	1.1	0	0.0
Illegible	17	0.4	0	0.0

Table 3. Most frequently reported specific exposure concerns (selected), after major deployments in general, 1 October 1998–30 September 2000, and after deployment to Uzbekistan, 11 September 2001–26 July 2002

	Other deployments		Uzbekistan	
Specific exposure concern	No.	%	No.	%
Anthrax immunizations	488	10.8	0	0.0
Air pollution	401	8.8	0	0.0
Tuberculosis	388	8.6	10	16.4
Dust	235	5.2	6	9.8
Depleted uranium	147	3.2	9	14.8
Asbestos	142	3.1	13	21.3
Pollution, in general	116	2.6	0	0.0
Water pollution	114	2.5	2	3.3
Oil fires, refineries	98	2.2	0	0.0
Sanitation	91	2.0	6	9.8
Food sanitation	83	1.8	1	1.6
Chemicals/chemical agents	66	1.5	17	27.8
Mosquitoes/bugs	62	1.4	1	1.6
HAZMAT site	50	1.1	1	1.6
Fuels	34	0.7	6	9.8
Radiation in general	25	0.6	17	27.9
Uranium	0	0.0	19	31.1
Petroleum products	0	0.0	2	3.3
Rodents	0	0.0	2	3.3

Legionnaires' Disease in a Laboratory Worker at a Medical Treatment Facility, September 2002

Legionella pneumophila is a gram-negative bacterium that causes two clinically and epidemiologically distinct illnesses. Legionnaires' disease is an acute infectious illness that is characterized by fever, myalgias, cough, and pneumonia; it can also have gastrointestinal, central nervous system, and renal manifestations. Without timely and effective treatment, Legionnaires' disease can progress to respiratory failure and death. Pontiac fever is a milder illness that is characterized by abrupt-onset, self-limited course, and influenza-like presentation (without pneumonia). The incubation period of Legionnaires' disease (5-6 days) tends to be longer than that of Pontiac fever (1-2 days). [1] The majority of *Legionella*-associated illnesses in the United States are caused by *L. pneumophila* serogroup 1.[1-3] Increased risk of Legionnaires' disease has been associated with older age, smoking, diabetes mellitus, immunosuppression, and recent travel.[1-6]

Legionnaires' disease accounts for approximately 2-5% of community acquired pneumonias in North America. Cases are more often sporadic than outbreak-associated, and more cases occur in the summer and fall than in other seasons. During outbreaks of Legionnaires' disease, attack rates in affected populations are generally low (0.1-5%).[1] In contrast, attack rates during outbreaks of Pontiac fever have been reported as high as 95%.[1]

Most human infections with *L. pneumophila* are acquired through inhalation of aerosolized particles less than 5 micrometers in diameter. Common sources of human infections are aerosol-producing devices in public places (e.g., air conditioning-cooling towers, evaporative condensers, whirlpool spas, humidifiers) and potable water systems in homes, workplaces, and medical institutions.[1-6] Person-to-person transmission of *L. pneumophila* has not been demonstrated. Outbreaks of legionellosis have been reported infrequently in military populations and settings.[7-10]

This report describes a case of Legionnaires' disease in an active duty soldier who worked in a laboratory of a military medical treatment facility.

Case report: On 3 September 2002, a 39-year-old male non-commissioned officer in the U.S. Army emptied a container of condensate fluid from a malfunctioning refrigerator. Two days later, the soldier was treated symptomatically for pleuritic chest pain. On 9 September, the soldier sought treatment for cough, fever (to 103-104F°), and abdominal pain. A clinical evaluation revealed rales, a left lower lobe infiltrate, and air fluid levels (on upright abdominal radiograph). The clinical assessment was pneumonia versus early small bowel obstruction. The patient was discharged to quarters for 72 hours and treated with amoxicillin/clavulanate. Two days later, the patient presented to a civilian emergency room where he was diagnosed with pneumonia. The following day, he was referred from the local military medical clinic to the Walter Reed Army Hospital where he was admitted to the medical intensive care unit with dyspnea, fever (105F°), cough, and hypoxia.

During his hospitalization, blood cultures were negative, a sputum culture grew normal flora, his white blood cell count reached 20,600 per µL, and a *Legionella* urinary antigen test was positive. The patient was initially treated with intravenous azithromycin, intravenous ceftriaxone, and supplemental oxygen. After 2 days, the antibiotic regimen was changed to oral azithromycin (500 mg per day x 10 days). The patient was discharged on the fourth hospital day.

The patient had traveled to New York City the week prior to his illness. While there, he stayed with relatives who were healthy during and following his visit. His companions on the trip also remained healthy. He denied exposures to water particulates and mists during the trip.

The affected soldier worked in the clinical laboratory of an Army medical treatment facility. During his illness, 4 of 13 of his coworkers in the laboratory had upper (but not lower) respiratory symptoms. The clinical courses of the 4 workers with upper respiratory symptoms were not suggestive of Legionnaires' disease or Pontiac fever. Three of the 4 workers with upper respiratory symptoms had

Legionella urinary antigen tests: all were negative. There were no reports of *Legionella* pneumonia among visitors to the laboratory, patients of the facility, or workers in other areas of the facility. Of note, two repairmen who worked on the evaporator/condenser of the malfunctioning refrigerator (on the same day the affected soldier emptied the condensate and cleaned the refrigerator) remained healthy.

The water and ventilation systems of the affected laboratory were reviewed. The ventilation system was a "closed circuit" that was isolated from other sections of the facility. Ventilation, potable water, and steam pipes passed through the space above the ceiling of the laboratory.

For 3 to 4 weeks prior to the onset of illness in the affected servicemember, there was a leak from the ceiling into a trashcan near the affected soldier's office. The leak originated in a sewer ventilation pipe that had serviced a sink that was removed in a renovation several years earlier (the sewer ventilation pipe was not properly sealed during the renovation). The installation of new equipment in a room above the laboratory had enabled water to condense inside the pipe and trickle down to the floor below. In early September, the obsolete sewer ventilation pipe was capped—and the leak was sealed.

On 20 September, six water samples were collected for direct fluorescent antibody testing for *Legionella*. Samples were drawn from hot and cold water lines in the men's bathroom and in the break/conference room; from the drinking fountain in the hallway outside the laboratory; and from condensate of the refrigerator (after it had been cleaned and repaired). No samples were retrievable from the source of the ceiling leak. The samples of hot water in the men's room and cold water in the break/conference room had 10 counts per milliliter (ml) of legionella; all other samples had <10 counts per ml. Occupational Safety and Health Administration (OSHA) guidelines recommend prompt cleaning and/or biocide treatment of domestic water systems with >10 colony forming units of legionella per ml.

Editorial comment. Several findings of the investigation of this case suggest that it was sporadic rather than outbreak-related. First, the source of the soldier's infection could not be identified; second, no other cases of legionella-associated illnesses were identified among patients, coworkers, or other contacts of the case; third, the affected laboratory did not do culturing for legionella (clinical specimens that required culturing for legionella were sent to another laboratory) and hence, there was minimal risk of occupational exposures to legionella; and fourth, there were no apparent cross-connections between the ventilation duct above the ceiling in the laboratory and either the water distribution system or steam pipes.

Potable water systems are often colonized with legionella. However, unless contaminated water is aerosolized and/or unless susceptible (e.g., immunocompromised) hosts ingest water with high concentrations of legionella, potable water is generally not considered a significant source of legionellosis. In the subject facility, there were minimal opportunities for aerosolization of legionella from either the water supply or the heating, ventilation, and air conditioning (HVAC) systems. However, to address the unlikely possibility that the domestic water system was the source of the case's infection, hot and cold water samples from outlets in and near the laboratory were assayed for legionella. Concentrations of legionella in two of the samples were at the action threshold for remediation suggested by OSHA. At such low concentrations of legionella, preventive treatment is recommended to inhibit further growth/spread of the bacteria in the system.

Thermal disinfection is commonly used to decontaminate water distribution systems in hospitals, hotels, and other institutional buildings. During thermal disinfection, hot water temperatures are elevated to above 70°C (158° F). Distal sites, such as faucets and showerheads, are flushed for twenty to thirty minutes after water temperatures are at target levels. The procedure is relatively inexpensive but labor intensive.

Hyperchlorination is also used to disinfect water distribution systems; however, it is generally reserved for systems with high concentrations of legionella (unlike the system mentioned in this report). During hyperchlorination, free chlorine levels are maintained at 50 parts per million (ppm) for one hour or 20 ppm for two hours. When target chlorine concentrations are achieved, faucets are flushed until the odor of chlorine is apparent.

Routine maintenance procedures are useful to inhibit legionella growth in water systems. For example, hot water tanks should be maintained at temperatures of at least 60°C, and hot water should be delivered to outlets at temperatures of at least 50°C.

Hot water tanks should be drained periodically to remove scale and sediment; cleaned with chlorine solution, if possible; and thoroughly rinsed to remove excess chlorine before reuse. Potable water systems, particularly in medical facilities, should be monitored to detect and measure concentrations of legionella and other possible contaminants. Results of inspections/assays and routine maintenance practices should be carefully documented. Finally, repairs, renovations, and upgrades of water systems should be expeditiously and completely executed.

Report and editorial comment by Laurie A. Cummings, LTC, MSC, and Scott J. Vice, CPT, MSC, USACHPPM-North; CPT Winico Martinez, Fort Meade, Maryland; Todd J. Vento, MAJ, MC, and Lisa Keep, LTC, MC, Walter Reed Army Institute of Research; and Stephanie L. Scoville, DrPH, Robert T. Pero, LTC, MC, USACHPPM.

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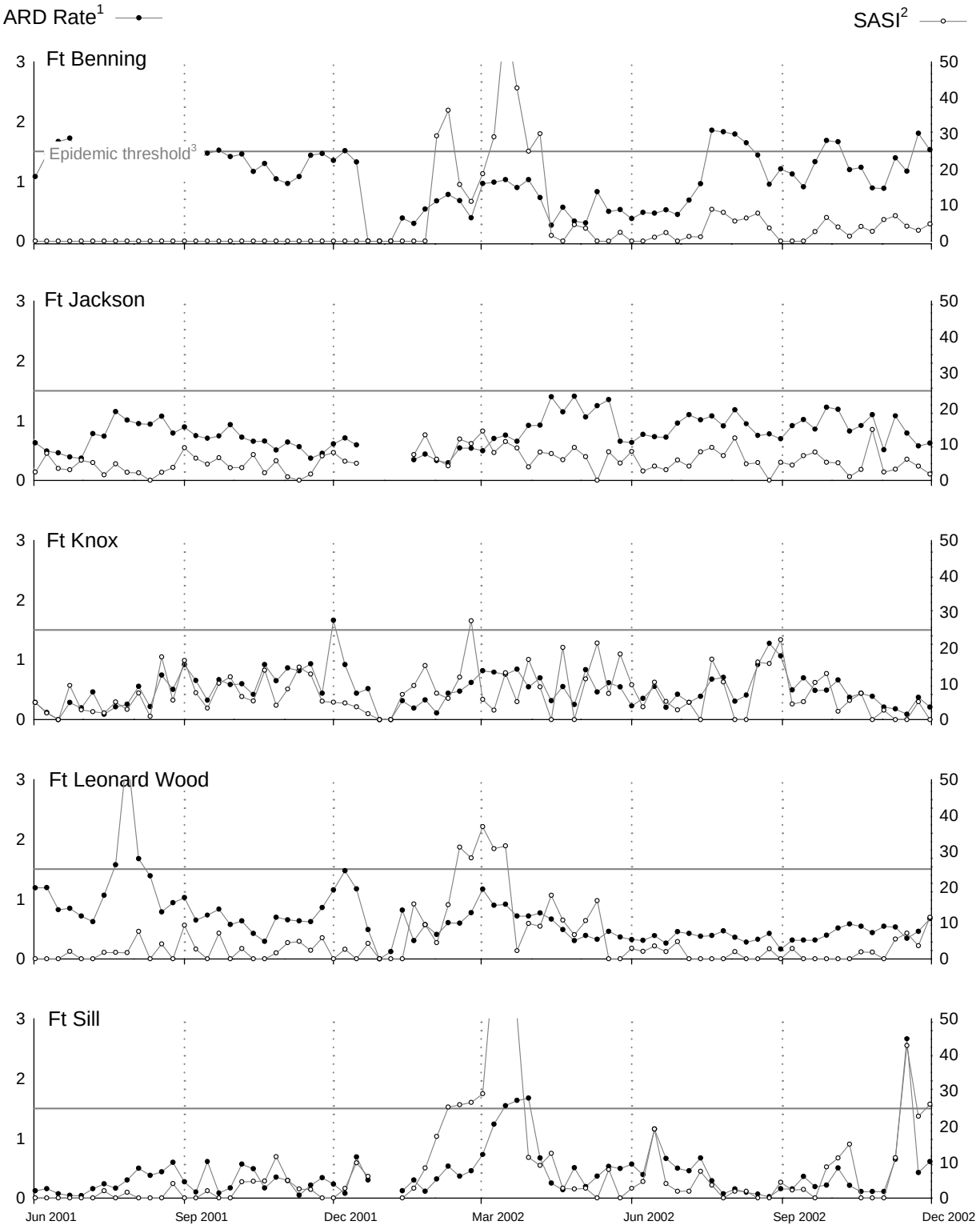
Acute respiratory disease (ARD) and streptococcal pharyngitis (SASI), Army Basic Training Centers by week through November 30, 2002



[1]ARD rate = cases per 100 trainees per week

[2]SASI (Strep ARD surveillance index) = (ARD rate)x(rate of Group A beta-hemolytic strep)

[3]ARD rate >=1.5 or SASI >=25.0 for 2 consecutive weeks indicates an "epidemic"

Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through November 30, 2001 and 2002

Reporting location	Number of reports all events[3]		Food-borne								Vaccine Preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
NORTH ATLANTIC																
Washington, DC Area	110	96	1	3	3	3	3	-	3	4	-	2	-	-	2	1
Aberdeen, MD	40	34	-	1	-	1	-	-	-	-	-	-	1	1	-	-
FT Belvoir, VA	65	70	5	4	5	-	2	3	-	-	-	-	-	-	-	-
FT Bragg, NC	1,221	1,441	2	7	-	-	4	6	1	5	-	-	5	1	3	-
FT Drum, NY	119	104	1	1	-	-	1	-	-	-	-	-	-	-	-	-
FT Eustis, VA	159	162	1	1	-	-	1	1	-	1	-	-	-	1	1	2
FT Knox, KY	180	143	-	3	1	1	2	1	-	-	-	-	-	-	1	-
FT Lee, VA	177	159	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Meade, MD	47	70	-	-	-	-	-	-	-	-	-	-	-	-	-	1
West Point, NY	48	83	1	-	-	-	1	-	-	-	2	2	-	1	-	1
GREAT PLAINS																
FT Sam Houston, TX	251	227	-	-	1	-	-	-	-	-	-	-	-	-	-	-
FT Bliss, TX	127	137	1	-	3	1	-	-	-	1	-	-	1	2	1	-
FT Carson, CO	459	386	1	6	3	3	2	1	-	-	-	-	1	1	-	-
FT Hood, TX	1,452	1,652	1	1	-	-	3	5	-	-	-	-	8	-	2	-
FT Huachuca, AZ	30	52	1	-	-	-	-	-	-	-	-	-	-	-	1	-
FT Leavenworth, KS	20	27	-	-	-	-	1	-	-	1	-	-	-	-	-	-
FT Leonard Wood, MO	162	184	1	-	-	-	-	3	-	-	1	-	-	-	6	4
FT Polk, LA	187	164	-	-	-	-	-	1	-	1	-	-	-	-	-	-
FT Riley, KS	176	216	-	-	-	-	1	-	-	-	-	-	1	1	-	1
FT Sill, OK	330	251	-	1	-	-	1	-	-	-	-	-	1	-	2	-
SOUTHEAST																
FT Gordon, GA	134	119	-	-	-	-	-	-	-	-	1	-	1	-	-	-
FT Benning, GA	277	323	1	-	1	1	2	6	2	-	-	-	-	-	5	3
FT Campbell, KY	556	455	3	1	6	1	2	1	1	2	-	-	-	-	-	3
FT Jackson, SC	269	255	-	-	-	-	-	-	-	-	-	-	5	1	2	1
FT Rucker, AL	57	50	-	1	-	-	1	-	-	-	-	-	-	-	-	-
FT Stewart, GA	345	393	-	-	-	1	1	1	-	1	-	-	1	-	-	1
WESTERN																
FT Lewis, WA	490	510	4	1	-	1	4	2	-	-	-	-	1	-	-	-
FT Irwin, CA	64	45	-	-	-	-	-	-	-	-	2	-	1	1	2	-
FT Wainwright, AK	95	81	-	1	-	-	-	-	-	-	-	-	-	-	-	-
OTHER LOCATIONS																
Hawaii	508	489	16	20	5	3	8	4	3	-	-	-	1	1	-	-
Europe	1,279	1,633	27	23	-	-	33	16	1	1	3	2	10	7	7	5
Korea	45	528	-	-	-	-	1	5	-	-	-	1	-	-	2	1
Total	**9,479**	**10,539**	**67**	**75**	**28**	**16**	**74**	**56**	**11**	**17**	**9**	**7**	**38**	**18**	**37**	**24**

1. Includes active duty servicemembers, dependents, and retirees.

2. Events reported by December 7, 2001 and 2002.

3. Seventy events specified by Tri-Service Reportable Events, Version 1.0, July 2000.

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

(Cont'd) Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through November 30, 2001 and 2002

Reporting location	Arthropod-borne				Sexually Transmitted								Environmental			
	Lyme Disease		Malaria		Chlamydia		Gonorrhea		Syphilis[3]		Urethritis[4]		Cold		Heat	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
NORTH ATLANTIC																
Washington, DC Area	1	3	-	1	52	50	16	10	7	4	-	-	-	-	-	2
Aberdeen, MD	-	1	-	-	26	27	8	3	-	-	2	-	2	-	-	-
FT Belvoir, VA	-	2	-	-	37	43	10	11	-	1	-	-	-	-	3	2
FT Bragg, NC	-	-	13	4	512	1000	249	197	-	-	226	115	7	-	192	105
FT Drum, NY	-	-	-	2	87	66	25	21	1	-	-	-	2	-	-	14
FT Eustis, VA	-	1	-	-	96	119	47	33	-	-	-	-	-	-	10	3
FT Knox, KY	-	-	1	-	139	99	31	34	2	-	-	-	-	-	2	3
FT Lee, VA	-	1	-	-	130	132	47	24	-	-	-	-	-	-	-	2
FT Meade, MD	-	3	-	-	34	56	11	7	1	-	1	2	-	-	-	-
West Point, NY	27	17	-	-	13	16	1	8	-	-	1	-	-	-	1	37
GREAT PLAINS																
FT Sam Houston, TX	-	-	1	-	198	173	35	44	-	-	3	-	1	-	8	2
FT Bliss, TX	1	-	4	-	83	104	24	16	-	1	-	-	-	-	5	1
FT Carson, CO	-	-	-	2	327	269	47	37	-	-	77	61	-	1	-	-
FT Hood, TX	-	-	4	5	749	864	291	344	2	3	324	381	-	-	62	40
FT Huachuca, AZ	-	-	-	-	25	44	3	6	-	-	-	-	-	-	-	2
FT Leavenworth, KS	-	-	-	1	15	18	2	7	-	-	-	-	-	-	-	-
FT Leonard Wood, MO	-	-	-	1	92	124	33	33	-	-	6	2	3	1	15	12
FT Polk, LA	-	-	1	1	136	108	45	46	-	2	-	-	-	-	2	1
FT Riley, KS	-	-	1	2	112	154	32	41	-	-	-	-	3	12	25	3
FT Sill, OK	1	-	1	2	168	132	82	46	-	-	58	49	-	1	12	19
SOUTHEAST																
FT Gordon, GA	-	1	-	1	113	93	11	14	-	1	-	-	-	-	2	1
FT Benning, GA	1	-	1	1	135	129	53	83	-	1	1	-	-	-	44	94
FT Campbell, KY	2	-	1	3	422	317	109	94	1	1	-	-	-	1	8	24
FT Jackson, SC	-	-	-	-	170	207	57	40	3	1	-	-	1	3	27	2
FT Rucker, AL	-	-	-	1	43	28	8	15	-	-	-	-	-	-	4	5
FT Stewart, GA	-	2	1	1	89	227	106	115	1	1	135	1	-	-	11	42
WESTERN																
FT Lewis, WA	-	-	-	3	302	332	68	59	1	2	105	104	4	-	-	-
FT Irwin, CA	-	-	-	-	31	32	13	10	-	-	-	-	-	-	13	1
FT Wainwright, AK	-	1	-	-	69	59	2	5	-	-	-	-	23	12	-	-
OTHER LOCATIONS																
Hawaii	-	-	-	2	401	361	54	70	-	1	1	-	-	-	-	13
Europe	4	6	5	8	975	1182	184	356	1	6	2	3	11	4	5	8
Korea	-	-	12	20	7	372	16	109	1	-	1	1	-	4	4	12
Total	**37**	**38**	**46**	**61**	**5,788**	**6,937**	**1,720**	**1,938**	**21**	**25**	**943**	**719**	**57**	**39**	**455**	**450**

3. Primary and secondary.

4. Urethritis, non-gonococcal (NGU).

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

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The Medical Surveillance Monthly Report (MSMR) is prepared by the Army Medical Surveillance Activity , Directorate of Epidemiology and Disease Surveillance, US Army Center for Health Promotion and Preventive Medicine (USACHPPM).

Data in the MSMR are provisional, based on reports and other sources of data available to AMSA.

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